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# The immature stages of *Ablabesmyia cinctipes* (Johannsen) with comments on ecology

(Insecta, Diptera, Chironomidae)

by Broughton A. Caldwell

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The larva of *Ablabesmyia (Karelia) cinctipes* (Johannsen) is described for the first time. The association of a previously described pupa thought to be this species is confirmed. Characters of the larva are typical for the subgenus, whereas certain structural aspects of the pupal respiratory organ (thoracic horn) are atypical. The immature stages are readily separable from those of other North American congeners. Larvae have been found in a lentic (pond) environment associated with algal and detrital material.

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## Introduction

*Ablabesmyia (Karelia) cinctipes* (Johannsen) was described from specimens collected in Miami, Florida (Johannsen 1946). The species has been subsequently reported from several additional states (Roback 1971; Hudson et al. 1990). A recent review of the immature stages of the genus (Roback 1985) did not include this species. Through association with adults, Beck and Beck (1966) presented a very brief description of the probable pupa. Beck (1976 1979) constructed a key to separate the larva of *A. cinctipes* from other congeners, basing identification on posterior parapod claw color and number of palpal segments. The key was originally developed in a syllabus for a course on larval chironomids, but information was not presented as to why these larval characteristics were thought to represent those of *A. cinctipes*.

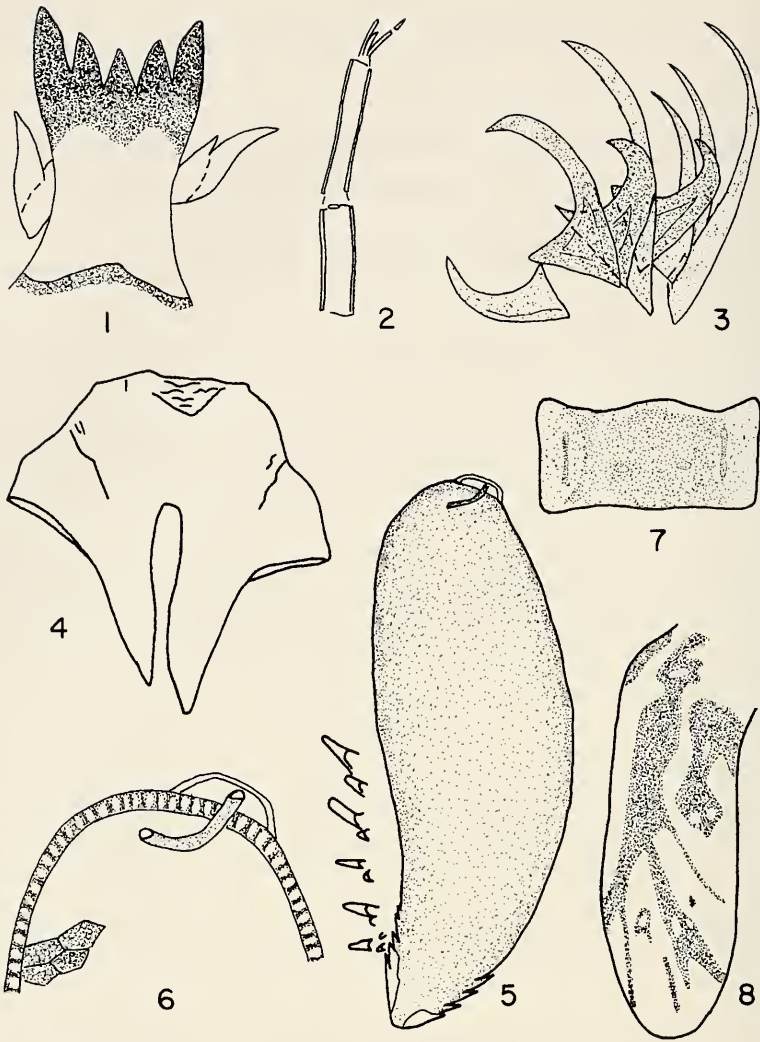
Recent rearings of chironomids from a small pond in southeastern coastal Georgia produced several adults of *A. cinctipes*. These rearings enabled positive association and recognition of the immature stages.

## Methods

Specimens for this study were preserved in 70% ethanol prior to clearing, dissection, and mounting in Canada balsam. The association of the immature stages is based upon individual larvae reared in isolation. The general terminology follows Saether (1980), with some exceptions following Roback (1985). The following abbreviations are also utilized: Le = larval exuviae, L = larva, Pe = pupal exuviae, P = pupa. Table 1 is formatted following Roback (1985) to facilitate comparisons of ratios, measurements, and characters.

## *Ablabesmyia (Karelia) cinctipes* (Johannsen)

LARVA (n=6). Head capsule pale yellow-brown, body pale, generally unpigmented. Ligula with apices of teeth concave, inner tooth slightly curved outward on inner margin, apex not curved outward



Figs 1-8. *Ablabesmyia (Karelia) cinctipes* (Johannsen). Larva. 1. ligula and paraligula; 2. maxillary palpus; 3. darkened and other posterior parapod claws; Pupa. 4. frontal apotome; 5. respiratory organ (thoracic horn) and thoracic comb; 6. apex of respiratory organ; 7. abdominal tergite IV; 8. wing pad.

(Fig. 1). Maxillary palpus two segmented, basal segment usually shorter (Fig. 2). Body with few fine scattered setae. Posterior parapod without a strongly hooked claw. Most apical claws pale yellow-brown with two of the more robust and one of the more slender claws slightly darker (Fig. 3). Other larval characters and measurements as in Table 1.

PUPA (n=8). Coloration mostly yellow-brown. Cephalothorax with extensive darker markings producing a mottled appearance. Frontal apotome (Fig. 4) with dorsal depression and wrinkles. Respiratory organ (thoracic horn) (Fig. 5) ellipsoidal with constricted lower portion, light brown in color with a distinct reticulate pattern. Aeropyle tube somewhat curved, apex approximately same diameter as rest of tube (Fig. 6). Thoracic comb (Fig. 5) with about 6-10 larger spines and several smaller spines with blunt or rounded apices. Tergite IV uniformly light brown or light brown centrally with lighter distal areas (Fig. 7). Faint paired medial muscle marks discernible in most specimens. Wing

Tab. 1 Comparative measurements ( $\mu$ ), ratios, and characters for *Ablabesmyia cinctipes*. V = veins infuscated, SP = spots, L = lacking, Superscript no. - n for  $\bar{x}$ .

| LARVA                          |           |                     | PUPA                      |           |                     |
|--------------------------------|-----------|---------------------|---------------------------|-----------|---------------------|
|                                | Range     | $\bar{x}$           |                           | Range     | $\bar{x}$           |
| A <sub>1</sub> -L              | 452-510   | 483 <sup>10</sup>   | RO-L                      | 412-528   | 464.4 <sup>12</sup> |
| CS,A <sub>1</sub>              | 0.56-0.63 | 0.60 <sup>10</sup>  | ANi-L                     | 12        | 12 <sup>12</sup>    |
| A <sub>2</sub> -L              | 90-110    | 99.8 <sup>8</sup>   | ANi/RO                    | 0.02-0.03 | 0.026 <sup>8</sup>  |
| AR                             | 4.58-5.19 | 4.82 <sup>8</sup>   | pos. LS <sub>1</sub> VII  | 0.39-0.47 | 0.421 <sup>6</sup>  |
| MD-L                           | 168-203   | 186.3 <sup>9</sup>  | pos. LS <sub>1</sub> VIII | 0.25-0.38 | 0.325 <sup>6</sup>  |
| A <sub>1</sub> /MD             | 2.51-2.66 | 2.60 <sup>9</sup>   | WP                        | V+SP      |                     |
| Li-L                           | 93-106    | 101.0 <sup>6</sup>  | AL-L                      | 400-458   | 416.5 <sup>6</sup>  |
| Li-Mt/0                        | 0.70-0.94 | 0.86 <sup>6</sup>   | OS-AL                     | L         |                     |
| P <sub>1</sub> -L              | 46-54     | 50.7 <sup>12</sup>  | GS/AL $\delta$            | 0.72-0.82 | 0.763 <sup>3</sup>  |
| P <sub>2</sub> -L              | 37-51     | 44.1 <sup>12</sup>  | pos. LS <sub>1</sub> AL   | 0.40-0.48 | 0.440 <sup>6</sup>  |
| P <sub>1</sub> /P <sub>2</sub> | 0.90-1.32 | 1.16 <sup>12</sup>  |                           |           |                     |
| Pc-L                           | 97-120    | 109.4 <sup>10</sup> |                           |           |                     |
| Pc-L/W                         | 2.4-3.3   | 2.91 <sup>9</sup>   |                           |           |                     |
| darker Cl,PP                   | 3         |                     |                           |           |                     |

pads with distinct veins and pattern as shown in Fig. 8. M vein usually incomplete or lacking. Outer posterior margin of anal lobe with several very small, sharp spines. Other pupal characters and measurements as in Table 1.

### Discussion

As adults, both *Ablabesmyia cinctipes* and *A. annulata* can be reliably separated solely on the basis of leg banding. However, most other species (males) must be identified also by utilizing genital characters (Roback 1971). In the immature stages identification is, at best, difficult, and association of all the life stages by rearing is the most certain way of species identification (Roback 1985). No key has been available to identify the pupa of *A. cinctipes*. A key to separate the larva from other congeners has been available (Beck 1976, 1979), but all species of *Karelia* possess two palpal segments and interpretation of degree of claw coloration may be somewhat subjective. Thus, positive separation of larvae of *A. cinctipes* using Beck's key would be very difficult.

Although aware of the tentative association of pupal and adult *A. cinctipes* by Beck and Beck (1966), Roback (1985) possibly doubted the validity of the association due to the reported shape of the aeropyle tube. A T-shaped apex of the aeropyle tube was used by Roback (1985) as one diagnostic character for *A. (Karelia)* species.

Four subgenera are recognized (*Ablabesmyia*, *Karelia*, *Asayia*, and *Sartaia*; Roback 1971, Roback 1983, Roback 1985) with only *Sartaia* based exclusively on the male. The larva and adult of *A. cinctipes* readily fit Roback's (1971, 1985) respective generic and subgeneric diagnoses. The pupa also fits his subgeneric diagnosis (Roback 1985) except for the shape of the apex of the aeropyle tube and short length of the apical nipple. It is uncertain as to what significance the shape of the apex of the aeropyle tube may ultimately have in influencing subgeneric limits.

In the keys of Roback (1985) the larva of *A. cinctipes* will key to couplet 5 (considering that the inner tooth of the ligula is not relatively straight). It can be separated from *A. philosphagnos* and the remaining three species by the coloration of the posterior parapod claws, antennal segment lengths, and maxillary palp segment lengths. The pupa will key to couplet 13 (in part). It may be distinguished from the other species by wing pad characters and coloration of tergite IV. The sparse, very small spines of the outer posterior border of the anal lobe may also aid in separation. Additional rearings from other geographic areas would be helpful in assessing any possible variation of claw coloration.

## Ecology

The specimens in this study were collected from a small, shallow, wellwater-fed pond in an office park/motel complex in coastal Georgia. The pond bottom consists mostly of sand with some mud overlain with hardwood and evergreen leaves. Growths of *Chara* sp. are prevalent in the pond during warmer months. The water is transparent to the bottom of the pond (approximate maximum depth 3 M). Runoff from adjacent parking areas enters during storms. Water chemistry parameters have been measured on three dates (XI-1990, I-1991, and II-1991). Ranges for several parameters were: pH 7.6-8.8 std. units; conductivity 410-494  $\mu\text{mho}/\text{cm}$  @ 25C; and dissolved oxygen 5.8-8.7 mg/l. The maxima for pH and the range for conductivity are the highest yet noted for an *Ablabesmyia* species.

Larvae of *A. cinctipes* were collected in the littoral area of the pond from vegetation and detritus mixtures to a depth of about 1M. Larval densities are generally very low, with few larvae obtained per collecting effort. Adults are scarce in the general area of the pond.

As reported by Roback (1985), larvae of the subgenus *Karelia* seem to prefer ponds, swamps, and lakes. This preference is shared by *A. cinctipes*, based upon these collections. Additional collections of the author covering 20 years have not contained any immature stages of *A. cinctipes* from lotic waters.

Material examined. Georgia, USA. Glynn County, 7-II-1990, pond at Plantation Village Office Park/Country Hearth Inn, Demere Road, St. Simons Island, leg. B.A. Caldwell, 1 reared  $\delta$ , 1 reared  $\text{♀}$ , 1 L. reared to P. Same data except 8-V-1990, 1 reared  $\text{♀}$ , 1 Pe. Same data except 7-VI-1990, 2 Pe. Same data except 30-I-1991, 2 L. Same data except 26-II-1991 1 Pe. Specimens are in the collection of the author.

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